before concluding my address regarding the necessity of some limitation in the amount of anatomical details which you are expected to remember in your professional examinations. My remarks on this head must be very brief; but fortunately you will find the question fully and ably discussed in recent numbers of the medical journals by two experienced teachers, Professors Macalister and Haycraft. No one at all familiar with medical education can doubt the existence of what my friend Professor Macalister very truly calls "the grievous burden of the student." No one will, I presume, question the necessity of a careful dissection of the whole body by those who desire to qualify themselves for the diagnoses and treatment of the manifold diseases to which every part of the body is liable, and in many cases the knowledge thus obtained must be corrected and augmented by a study of frozen sections. To test the care and thoroughness with which this work has been done the examinations should be as practical as possible. Every examiner of experience knows how often one meets with students who can write long and elaborate anatomical papers containing minute and accurate descriptions of the form and relations of structures which in the dissecting-room they cannot dissect out or recognise. On the other hand, many a student whose memory for names is less retentive, and whose capacity for cramming is slight, shows at once, when confronted with dissections, a thoroughly practical familiarity with the subject. Too often examination papers set a premium on mere book knowledge, and the written portion of the examination is treated as of more importance than the oral. I believe that the mental labours of the student of anatomy would be lightened, his innate tendency to trust to mere book knowledge checked, and his practical studies encouraged were the written part of his examination made to occupy a subsidiary position or even abolished, and the oral portion made even more practical than at present. There are certain subjects in the medical curriculum in which the student must trust very largely to his notes and text-books, but happily this is not the case with anatomy. Many anatomical details which are given in our text-books are a useless burden on the memory of the student, having no special morphological significance or any bearing on their professional work. On the other hand, I believe that some in their zeal for reform appear to overlook the large mass of anatomical facts which can easily be shown to have a direct bearing upon the work of the surgeon and physician. It is because I believe that the number of these facts is constantly increasing with our advancing knowledge of disease that I recognise the necessity of some modification in our teaching and examinations.

THE HEART AS A GUIDE TO TREATMENT IN INFANTILE CONVULSIONS.

By ALEXANDER MORISON, M.D., F.R.C.P. EDIN.,
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By infantile convulsions I mean that group of phenomena, commencing with clonic muscular contractions and ending with coma, which may not all be met with in every case, but which are sufficiently often associated to form one clinical picture. If the fit occur during the day medical assistance is usually sought during the preliminary and most frequently convulsive stage of the disorder; but should it occur during the night this stage may have passed before the condition of the child has attracted attention, and the physician may then find the patient comatose. Objectionable as it may be in principle to describe a disease by a sign or symptom, there is a tacit concession of the convenience in some cases of emphasising a dominant feature. While, moreover, the removal of a cause is the scientific procedure in rational therapeutics, that cause, and therefore the essential nature of the disease, may be obscure; while an urgent symptom may point the quickest road to death and indicate at the same time the direction the immediate efforts of the physician should take in his endeavour to save life. It is because the case I am about to relate came within this category that I have used a symptomatic rather than pathological nomenclature. So grave were its features, so apparently consequent the action of the chief therapeutic agent, and so gratifying

the general issue that I made very complete notes at the time and reproduce them *verbatim*.

L. B—, a female child nineteen days old, was in good health on July 9th, 1881. At 10 A.M. on that day she had half a breakfastcupful of thin oatmeal gruel (grits); at 3 P.M. "the bottle," with about one ounce of milk and water (1 to 3); and at 8.30 P.M. half an ounce of oatmeal gruel. In the interval between these times, being more restless than usual, she was suckled more frequently than ordinarily, and her mother said that "she took the breast very freely indeed." Since she was three days old she has had more or less gruel, and also cow's milk and water, and last, but not least, the mother's milk. The infant may, therefore, be said to have been on tolerably full diet, and, considering the normal absence of the salivary secretion, not under the best conditions for the digestion of farinaceous food. The child was stated not to have taken any narcotic drug—an important point, as the context will show. On July 10th, about 12.30 A.M., the child was noticed to be breathing heavily, but was not further observed till 4 A.M., when she was applied to the breast, but would not suckle, and was again seen to be "breathing hard." A teaspoonful of castor oil was given her, she was placed in a hot bath, and I was sent for. She was seen by me at about 5 A.M., when her condition was as follows. Respiration was about 12 per minute, very slow and infrequent, and prolonged into a stertorous snore, such as one observes shortly before death; the heart's beat was about 10, 15, and 20 per minute; the body was cold; the patient was perfectly unconscious, and the pupils were contracted to the size of a small pin's head; both pupils were equally contracted. The hot bath, with mustard poultices to the chest, abdomen, and back, served to rouse the circulation and respiration temporarily, but the former lethargic coma again supervened. There was no convulsion of the limbs, neck, or trunk, which were perfectly limp; but there was occasionally a convulsive quiver of the lips, with a rapid convulsive protrusion and retraction of the tongue at the same time. I used ether inhalation with artificial respiration without more than very transitory benefit. At times the heart was inaudible, and the respiration was so infrequent and the body so limp that I was uncertain whether the child were not really dead. I then determined as a last resource to use tincture of belladonna in such doses as to produce, if possible, an immediate effect on an apparently moribund subject. I accordingly injected a small teaspoonful—as nearly as I could judge from forty to sixty minims—with a little water per anum (not having with me a hypodermic syringe), and, having waited for two or three minutes without observing any effect on the contracted pupils or on the heart's action and respiration, gave per os, and pushed well down the throat so as to be swallowed, about half the same teaspoonful of the same tincture of belladonna, with ten drops of sulphuric ether. In a few moments, and quite suddenly, the pupils dilated to about three millimetres in diameter, and forthwith the heart bounded away like a steed which had suddenly wrenched itself loose from its fastenings. This acceleration continued for a longer time and was much more marked than that which followed any previous excitant; but it, too, at length began to yield to the comatose lethargy which appeared to be invincible. I therefore again gave a similar quantity of tincture of belladonna and ether per os, which was followed by a further dilatation of the pupils and increased cardiac acceleration. In all, the child had per anum and per os ninety minims of tincture of belladonna (B.P.) and from twenty to thirty minims of ether in addition to that inhaled. I should have mentioned that I emptied the bowels by enema, passing my little finger through the sphincter ani to evacuate all fluid &c. before injecting the belladonna. At 10 A.M. the pulse was 156, the temperature was 100.2° F., and the respiration was 72. There were frequent convulsive twitching and action of the tongue as above described, both pupils were dilated, the patient was unconscious, and reflex action was easily provoked. Ten grains of bromide of potassium were given. At 12.30 P.M. the pulse (heart) was 202, the temperature was 104°, and the respiration was 96. I applied a handkerchief which had been dipped in iced water to the head, and gave a little iced water per os. Sudden failure of the heart's action followed—that is, it rapidly slowed till it became inaudible—with cessation of respiration and fall of temperature. Artificial respiration was tried by squeezing the abdomen and bending the body forwards; then pressure was removed from the abdomen and the body bent backwards. Returning respiration came in infrequent gasps, sometimes accompanied by a whooping cry. About

twelve minims of brandy in water were injected per anum, with immediate acceleration of the heart and respiration, and rise of temperature; she was quite unconscious. At 5 P.M. the temperature was 102° and the pulse 186, and the patient was more sensitive. At 9.25 P.M. the temperature was 102.6°, the pulse was 192 and sensibility was greater, and the pupils were still dilated, but less so; the back was vesicated by the hot-water bottle; she had not urinated since 11 A.M.; linimentum calcis was applied for the burn. On July 11th the patient urinated at midnight, and freely again at 10 A.M.; the bowels acted at 3 A.M. and 9 A.M., the discharge being stringy and mucoid; the pulse was 156, the temperature 101.4°, and the respiration from 48 to 60. The vesication was better; the patient was quite sensitive, cried lustily, and was suckled three times; the pupils were still dilated, but rather less so, and feebly responded to light; the globes of the eyes moved freely, which they had not done on the previous day; the right especially was turned up and everted; the abdomen was still a little tympanitic, but less so than the day before. Sixty minims of castor oil were given; the child was directed to be suckled by the mother entirely and not more frequently than every two hours. At 6.25 P.M. the temperature was 99.6° and the pulse 156; the bowels had acted three times; she was crying, apparently from hunger, judging from the action of the lips and the tongue; the pupils were still dilated and did not respond to candle-light. On July 12th, at 12.45 P.M., the pulse was 126, the respiration 54, and the temperature 98.8°; the bowels had acted, and she had urinated freely; the pupils responded naturally to light, but were slightly dilated. Treatment was now directed to two scalds on the back from a six ounce hot-water bottle, and mustard poulticing; otherwise the child was well. I may add that she is now a healthy, well-grown girl twelve years of age, who has never had any further convulsive seizure, and that there is no history of a special liability to fits in the family.

Notwithstanding the tendency of authorities to condemn attempts at the classification of convulsions, there can be little doubt that it would be desirable for practical purposes were it possible to disentangle from the *mêlée* of symptoms which are grouped under the general term certain types of disturbance. This has already been done in the case of laryngismus stridulus, and might, I think, with advantage be attempted in some other instances; for there is no reason why that sign should monopolise importance when there are many others quite as important and constant as it. An attempt to classify convulsions according to their exciting cause, if of some use in practice, has not necessarily a very distinct relation to the type of effect. Hensch,¹ for example, relates the case of a child two years of age who, having partaken of some sauerkraut, manifested unusual sleepiness with irregular respiration, but whose pulse beat 120 times in a minute. In the case which I have related there was a like origin in indigestion, but there was also a prolonged inhibition of cardiac action which reduced the pulse-rate to an abnormal slowness. While, therefore, recognising the difficulty of distinguishing the chief lines of explosion in many cases of infantile convulsions, and without attempting to reduce these to order or law, it has appeared to me that there would be some practical utility in taking the condition of the heart's action as an index to treatment, and in emphasising this by a recognition of it in the symptomatic nomenclature of the disease.

In developing this line of thought I would refer to a case which I had an opportunity of seeing with Dr. Ostlere of Stoke Newington, not because of the rarity of such cases, but because its phenomena contrasted in most respects with my case, and because it seemed to respond as directly to a particular mode of treatment as did the case I have related. Dr. Ostlere has kindly given me the following notes. A male child thirteen months old and previously in good health fell out of his perambulator on Oct. 28th, 1892, and struck the back of his head. Next day he was seized with general convulsions. Dr. Ostlere quieted him with a chloroform inhalation, and left him apparently asleep, with a pulse of 130 and a temperature of 104° F. On the 30th the child had choreic movement of the limbs, was constantly protruding the tongue and opening the mouth "as if trying to retch," and had dilated pupils, which responded to light, with a pulse of 120 and a temperature of 102°. Bromide of potassium was

prescribed. Two hours later the muscular jerking is stated to have been limited to the right arm and leg "when disturbed," the abortive retching continued, the pupils were normal, and the pulse was 130. Next day, being the fifth day of the illness, the child is noted to have been very quiet, to have noticed objects, and to have had a green watery diarrhoea. The pulse was 120 and the temperature 101°. Next day Dr. Ostlere notes that there was "more rolling of the head and jerking of the limbs on the right side. The pulse was scarcely perceptible and was uncountable; heart's beat by stethoscope from 220 to 230; temperature 101° and respiration 40; diarrhoea continues; takes the breast; five minims of digitalis were prescribed to be taken every four hours." On the seventh day of the illness the child remained in much the same condition. "The pulse was from 220 to 240; respiration from 50 to 60; diarrhoea; twitching limbs; no sickness; pupils dilated and acting." On the evening of this day I had an opportunity of seeing the case with Dr. Ostlere. The pulse, counted with the stethoscope, was 238 a minute, the respiration about 60, and the temperature 100.5. We agreed to apply ice to the head. Bromide of potassium was also prescribed. The remainder of the report I copy *verbatim* from Dr. Ostlere's notes: "Saturday, the eighth day: seems stupid; no crying; diarrhoea a little less frequent; takes the breast. They had applied ice in a bladder very irregularly, they said, as the child had begun to cough from the cold, as they supposed, so they left it off; in fact, I do not think they had used it for many minutes. Pulse from 200 to 210; respiration 58. Ordered ice-cap to be applied continuously. Sunday: child quiet; looking more sensible; diarrhoea better; pulse 120; respiration from 45 to 50. To keep on ice until evening. Monday: pulse 104; respiration 35; temperature 100°; cries on being disturbed; still jerking right arm and leg at intervals; seems to notice everything. I ceased attending after next day as the child was feeding and sleeping well, with no trace of the choreic condition, and a pulse of 94."

Whether some cases of what I may venture to term infantile tachycardial eclampsia, to distinguish them from cases such as that first related, are originally, and for a longer or shorter period, bradycardial, it is difficult to say, as it is rarely that the physician has an opportunity of seeing the patients at the commencement of symptoms. Writers frequently refer to an initial pallor, which it is theoretically possible to conceive as associated with cardiac arrest or inhibition; but cardiac action, to impress its character upon the symptomatology of a case, must be of a more persistent nature, as it was in the two typical instances adduced, and their successful treatment was based upon a recognition of the cardiac state. It is a commonplace of experimental physiology that direct or reflex irritation of the pneumogastric nerve produces an inhibition of the heart's action, and that this inhibitory influence of the vagus is abolished while the organism is under the influence of belladonna. It was a recollection of this fact, together with the history of the administration of improper food, that caused me to give that drug in the bradycardial case I have related. Professor Michael Foster² states that "after atropine, even in a minute dose, has been injected into the blood stimulation of the vagus, even with the most powerful currents, produces no inhibition whatever." It is interesting in view of this fact, however, to note that the sedative action of cold to the head while my patient was fully atropised seemed to cause a very sudden failure of the heart's action, as I have stated. In Dr. Ostlere's essentially tachycardial case, however, notwithstanding the length of time for which the child had been affected, and perhaps also because the patient was older, the continuous application of ice to the head, as far as could be judged, was directly curative.

If my treatment in the case first related should appear to have been somewhat too heroic, I must plead the justification of success and the apparent extremity of the little patient. Under similar circumstances I should certainly act on the same lines again, but should prefer the hypodermic injection of a smaller dose of belladonna or its equivalent in solution of atropine. As is well known, children tolerate preparations of belladonna comparatively better than adults. The generally acknowledged fact that very small doses of opium are frequently extremely prejudicial to young children would *a priori* suggest that larger doses of belladonna would be tolerated by them than one might otherwise suppose. Dr. Fuller proved this to be so in the case of twelve choreic children treated by him in St. George's Hospital. In a paper

¹ Diseases of Children, Translation of the Sydenham Society, p. 169, vol. 1.

² Text-book of Physiology, p. 171, third edition.

entitled "On the Administration of Belladonna and the Causes which modify its Action," read before the Royal Medical and Chirurgical Society in June, 1859, he stated that "adults cannot tolerate doses of the drug which can be taken with impunity by children." I would suggest that it would be interesting to inquire whether, in the case of a certain drug being "badly borne" by an individual from idiosyncrasy or disease, its physiological antidote is tolerated better than usual. I have not, however, been able to discover many particulars of the use of belladonna in infantile convulsions, although it has been so used, and perhaps it is calculated to be of most benefit in those cases in which there is a tolerably clear history of pneumogastric irritation. Dr. Charlton Bastian, who writes the article on Convulsions in "Quain's Dictionary of Medicine," speaks of the benefit accruing from a combination of quinine, belladonna, and bromide of potassium in some cases, but gives no special indications for the use of belladonna. *A priori*, one would expect it to be most beneficial in those cases in which physicians³ have found nitrite of amyl to be of use.⁴ I should, however, hesitate to employ either the one or the other were tachycardia present, and that because in infantile convulsions with quick heart and dilated pupil I have found belladonna to be as useless as it was useful in the case of L. B—, in whom the phenomena were of an opposite kind, and resembled very closely those of opium poisoning, from which it could only be distinguished by the presence of the limited convulsions related and the absence of a history of narcotic drugging.⁵ The case recalled to my mind one of opium poisoning which I noted some years previously. A healthy male infant six weeks old was given fifty minims of laudanum by his mother, who was suffering from puerperal mania, at 8.30 A.M. on Nov. 6th, 1878. I saw the child at 9 A.M., when it was comatose, had a slow pulse and respiration, lids half closed and languidly raised on slapping the surface of the body, skin cold, and pupils contracted to pin points. The use of the stomach-tube, external excitation, and artificial respiration had little effect, but the hypodermic injection of a solution of atropine in small doses never failed very rapidly to quicken both pulse and respiration, and warm the surface. The child was thus kept alive for fifteen hours, when it ceased to respond to treatment and died. Although one-tenth of a grain of the alkaloid in all was injected, and an additional one-twenty-fourth of a grain was given by the mouth, the quantity was possibly too small to neutralise the effects of the original poison. I regret that I had not an opportunity of observing the effect upon the pupils of the atropine injected, as some was dropped into the eyes when the child was fully comatose and before he had time to absorb the few drops given by the mouth previously to hypodermic injection. The pupils were thus dilated by the local application. Graves found belladonna of use in continued fever with contracted pupil and coma, and Dr. Thomas Anderson, arguing from this experience, was the first to use the drug as an antidote for opium poisoning.⁶ When, on the other hand, tachycardia is present, ice on the head is very effectual both as a febrifuge, if there be concurrent fever proportionate to the pulse-rate, and as a means of "pulling up" a "runaway heart" when fever is absent or not calculated to cause the rapidity of heart present. In the latter instance ice appears to act—(1) by direct sedation on the cardiac centre, and (2) by raising the blood pressure generally by a tonic influence on the peripheral vascular system through the vaso-motor centre.

Unlike the bradycardial case that forms the basis of this paper, such cases, on the other hand, present a close resemblance to the effects of belladonna poisoning, and while opium in the case of children is a double-edged weapon, its cautious use would be warrantable if the usual treatment by chloroform anæsthesia, bromide of potassium, or chloral proved ineffectual. Personally I have had no experience of opium in such cases, because my fear of its effects on infants has always held my hand, but Dr. Hughlings Jackson advises its use under certain circumstances in the form of Dover's powder. The cases in which he uses it are those in which there is least evidence of depression, and these

are usually such as evince cardiac acceleration.⁷ Dr. Eustace Smith⁸ also recommends the hypodermic injection of one-twenty-fourth of a grain in a child twelve months old when the case resists other treatment. There are some other points in this connexion which are worthy of consideration. The child L. B— was unconscious certainly from 5 A.M. on the 10th till 12.30 P.M. the same day, and probably for some time longer, while the contraction of the pupil was undone by belladonna and the heart's action synchronously released from inhibition between 5 A.M. and 6 A.M., and remained so, the former till 12.45 P.M. on the 12th, when they are noted as still being somewhat dilated, and the latter at the same date and time was practically normal. The acceleration of the heart and dilatation of the pupil, therefore, were not accompanied by a restoration of consciousness, although the pulse-rate, temperature, and respiration noted within that period indicated a vigorous flooding of the textures with blood. Dr. C. West⁹ considers that "convulsions in the infant answer to delirium in the adult." Whether, however, we accept this dictum of so much respected an authority or not, unconsciousness will, I think, be generally regarded as an identical phenomenon at all ages, although its associated signs may differ somewhat. If this be so, the clinical history of L. B— would seem to indicate that a restoration of diminished blood-supply is not alone necessary to a restoration of consciousness in such cases. The latter would then appear to depend upon a change in the cerebral nerve cells of a more intimate character—a change the chief sign of which is the unconsciousness in question, and which, if in the first instance active in the production of peripheral manifestations such as dilatation or contraction of the pupil and acceleration or retardation of the heart's action, cannot later be correctly measured by these.

Physiologists, again, have shown that the behaviour of the divided and stimulated cervical sympathetic, as regards its action upon the pupil, differs apparently from the effect of the same process on bloodvessels; for whereas the former is dilated the latter are contracted. The contracted pupil, therefore, so far as sympathetic irritation is concerned, is not brought about by the same mechanism as the contraction of bloodvessels, but appears in such cases, like the pupil of sleep, to be the result of anæmia of the brain and eye, and due in this instance to reflex spasm or bloodlessness of the cerebral vessels; or, like the pupil of chloroform and opium narcosis, to sedation of the nerve elements, with diminished functional activity. The dilated pupil of infantile convulsions, on the other hand, might conceivably accompany vascular spasm and be due to a like sympathetic irritation, for the retraction of the dilator iridis—an active dilatation of the pupil—would indicate spasm of the muscle under sympathetic innervation. One must, however, apply the conclusions of physiologists to practical medicine with caution, for in the patient we usually have a comparatively intact organism, with nerve junctions complete, and in which, therefore, a more complete mechanism has play than in the vivisectioned animal. Thus, in Claude Bernard's famous experiment, division of the sympathetic was followed by contraction of the pupil and dilatation of bloodvessels on the same side of the head—conditions, it is stated, which may subside in a few days, notwithstanding the removal of the superior cervical ganglion.¹⁰ At the bedside, however, dogmatism is sometimes even less admissible than in the physiological laboratory. Thus, I have notes of a case of double pleuro-pneumonia, which was under my care some years ago, and which recovered, in which, while both lungs were "resolving," the patient had a circumscribed flush on both cheeks over the malar bones. When the right lung had in great measure recovered, the flush only appeared on the left cheek, on which side, also, the pupil was distinctly dilated. The left side of the face was likewise hyperæsthetic. These phenomena usually continued for about two hours each morning for a time, and could not be accounted for by decubitus or pressure. Here vascular coincided with pupillary dilatation, and was apparently curiously related in some manner to the removal of inflammatory products in the lung on the same side. Physiologists have demonstrated the influence of stimulation of afferent nerves in producing a reflex spasm of the vascular system.¹² In the case of L. B— the *rationale* of the conditions

³ Dr. Eustace Smith: *Disease in Children*, p. 300. Dr. A. E. Bridger: *The LANCET*, April 22nd, 1882.

⁴ Dr. Eustace Smith considers it is especially indicated in the convulsions which complicate whooping cough. *Op. cit.*, p. 300.

⁵ The diagnosis of post-eclamptic coma with contracted pupils from the coma of opium poisoning, in the absence of an avowed knowledge of the administration of opium in the form of "soothing syrup" or in any other vehicle, must always be very difficult, if not impossible, clinically; but the indications for treatment are fortunately the same.

⁶ *Edinburgh Medical and Surgical Journal*, April, 1855.

⁷ Reynolds's *System of Medicine*, vol. ii., p. 239.

⁸ *Op. cit.*, p. 300.

⁹ *The Diseases of Infancy and Childhood*, sixth edition, p. 35.

¹⁰ Foster, *op. cit.*, p. 192.

¹² Foster, *op. cit.*, p. 198.

which presented itself to my mind was the generation by irritation, in the digestive apparatus, of afferent impulses passing up the vagi, and resulting in pronounced cardiac inhibition, with peripheral anæmia. Professor Foster appears to regard the direct inhibition of the heart by vagus irritation as of like mechanism with the vascular dilatation which follows faradisation of a severed nerve such as the chorda tympani, and that, I presume, would establish a resemblance likewise with the heart of syncope, which one knows may result from emotional stimulation of the vagi. But the pupil of syncope is a dilated pupil, and seems to depend upon the general lowering of cerebro-spinal "tonicity," which results in vascular and muscular relaxation, and, when less extreme, in the disturbed metabolism and general atony of the neurasthenic invalid. In cases, therefore, in which we find syncopal states associated with a contracted pupil—a spasmodic, not paretic, condition of a muscle innervated by a cerebral nerve—and in which we can exclude narcotic poisoning, we must seek some other solution than that of a cerebro-spinal exhaustion. In the case of L. B.—, therefore, associated as it was with a contracted pupil and apparently blanched brain, it is probable that the anæmia in question and retarded heart were associated with reflex vascular spasm. As, moreover, the afferent impulses active in the production of this state presumably travelled up the pneumogastric nerves, the atropisation of the patient was calculated to remove this causal element. That it did so may, I think, be fairly argued.

It is not remarkable that the behaviour of a structure so visible and so sensitive as the pupil should have been a favourite study both of physiologists and physicians. References to the subject are common in the text-books and periodicals of both branches of the profession. The clinical value of this sign, however, in any particular case has to be very carefully weighed. It may be of little consequence, or it may be all-important, but with pupillary contraction or dilatation in relation to more localised disease we are not at present concerned. That the relation of the general vascular tone to the state of the pupil is a constant one will not, I presume, be questioned. Watching beside a dying patient I have seen the pupil dilate widely and permanently at the moment of death. On another occasion which has impressed itself upon my memory a patient who had suffered from severe tonsillitis for some days, and who had refused food, on my puncturing his tonsil with a bistoury, fell back on his bed apparently dead. His heart and respiration ceased, his muscular system became quite flaccid, and the signal for these grave phenomena was a sudden and permanent dilatation of both pupils. He was fortunately resuscitated by artificial respiration. When, therefore, one meets, in cases in which there is a widespread disorder of the nervous system, as in infantile convulsions, with a slow pulse and contracted pupil there is, I would suggest, sufficient reason to assume that we have to do, not with a cerebro-spinal syncope, but with a powerful reflex vascular spasm in the first instance, associated with retarded cardiac action and rise of blood-pressure. It is probable, however, that another factor in the condition is the state of the nerve elements in the central nervous system induced by the preceding conditions of original stimulus of a nerve or nerves, and consequent arrest or diminution of blood-supply to the affected centres. Beyond this point speculation would at present be unwarrantable, although it is to be hoped that the changes inducing a disturbance of sensibility, and which precede observable histological changes in nerve cells, may yet come within the sphere of knowledge. At present the existence of these states is notified only by the occurrence of so-called "functional disorders." On the other hand, whilst one may admit that it is theoretically conceivable that dilated pupils may in such cases be associated with vascular spasm—and Dr. West¹² says that the pupil is either immovably contracted or dilated during the fit—if a dilated condition of the pupil be accompanied by a quick and feeble heart's action, it will, I think, usually be found to be associated with a paretic and syncopal state.

That the heart may be accelerated from other than peripheral vascular causes is well known. In a paper on the Origin from the Spinal Cord of the Cervical and Upper Thoracic Sympathetic Fibres¹³ Mr. J. N. Langley has shown that the first and second thoracic nerves appear to be most potent on stimulation, both to dilate the pupil and to accelerate

the heart, and that such acceleration may be obtained independently of a rise in blood pressure. That some forms of emotion also act thus is a common experience; but that very want of language and intellectual activity which, as Dr. West¹⁴ and others have remarked, renders the diagnosis of disease in children at times so difficult, has this countervailing advantage that it excludes in a great measure the disturbing factors due to emotion, which, when present, render it difficult to estimate aright the cause of some symptoms and the effect of some drugs. This fact, I would submit, only imparts greater value to the cardiac state regarded as the key to the treatment of infantile convulsions.

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SOME CASES OF SPORADIC CRETINISM, TREATED BY THE ADMINISTRATION OF THYROID EXTRACT.

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END HOSPITAL FOR NERVOUS DISEASES.

THE following cases illustrate well the vast improvement, both physical and mental, that this form of treatment induces. It is well known that it exerts a rapid and remarkable effect in the allied condition of myxœdema, but the results in the case of sporadic cretinism are perhaps the more remarkable. In the former class of cases a function, either obsolete or in a state of abeyance, is recalled into activity; in the latter class that function is instituted afresh in cases in which it has never existed. Before giving the details of these cases I wish to make a few preliminary remarks. It was found to be impossible to make satisfactory collections of the urine for examination, the patients having no control over their sphincters previously to treatment; the estimations of urea, therefore, are founded on the average of the examinations of several specimens obtained at different times of the day. I regret to say that a systematic record of change of weight was not made in the earlier cases, but a general account of the changes in this respect will be found. No observations were made on the excretion of mucin, the treatment in these cases having been commenced prior to the publication of the results obtained by Dr. W. M. Ord and Mr. White. I now append the details of the cases:—

CASE 1.—This patient, a female, first came under my notice in November, 1890, at the Victoria Hospital for Sick Children, Chelsea. She then presented marked symptoms of cretinism. In March, 1892, Mr. Clutton implanted beneath her left pectoralis major muscle a small piece of fresh human thyroid gland, obtained from a case of parenchymatous enlargement of the thyroid, from which he had excised a portion. The child improved in nutrition for a time after the operation, but it was found that after the lapse of eight weeks the implanted gland was practically absorbed, and the improvement ceased. She was readmitted in February, 1893; her age was then six and a half years. There was no history of insanity in the family, and her parents were in no way related. She had never walked, but could move herself about the floor, though she did not crawl like an ordinary child. She was extraordinarily like a monkey in appearance. Her hair was scanty and ragged, and her neck was thick, with lumps above each clavicle. No thyroid gland could be felt. She was on the whole good-tempered, but subject to fits of passion. Her skin was dry and never perspired. She could barely stand with assistance. Her legs were bowed, in a manner suggestive of rickety deformity. There was also some enlargement of the wrists. (See Fig. 1.) Her intelligence was small, but she seemed to appreciate sweet foods, and to like to be noticed by visitors. The urine when collected was light in colour, of sp. gr. 1008, and contained no albumen. The average of several examinations showed that there was present 0.4 per cent. of urea. Her temperature was, on the whole, subnormal, but occasionally it rose to normal—never above it. She commenced her thyroid treatment on March 1st. At first she was fed on the raw gland, minced, pounded, and mixed with jam. She did not like this, and on March 15th she was given the prepared powder of thyroid, the equivalent

¹² Op. cit., p. 39.

¹³ Philosophical Transactions of the Royal Society, 1892.

¹⁴ Op. cit., p. 3.